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ABSTRACT

This review examines all data-based ecologically valid studies published in "Learning Disability Quarterly" or "Journal of Learning Disabilities" that addressed reading instruction and were published from 1980 to 1990. It first looks at studies focusing on comprehension, including such reader factors as prior knowledge, metacognition, and visual imagery. It then examines studies focusing on text factors such as advance organizers and illustrations. Finally studies related to word identification and oral reading are discussed. Tables compare major studies in each category. Results of the review suggest that providing background knowledge, metacognitive training, and visual imagery training may result in improved comprehension for learning-disabled students, given sufficient time and instruction. Specific instruction on word identification to improve oral reading is supported, as are various types of text previewing. Evidence that error correction instructional techniques may facilitate both word recognition and comprehension is reported, as is evidence that academically handicapped children may benefit from placement with similar ability peers. (67 references) (DB)

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A Review of Current Research on Reading Instruction and the Learning Disabled Student

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Running head: RECENT INVESTIGATIONS RELATED TO READING

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Abstract

This article presents a review of current investigations related to reading instruction for learning disabled students. Studies reviewed directly address needs of classroom and special teachers working with these students. Results of this review suggest that providing background knowledge, metacognitive training, and visual imagery training may result in improved comprehension for learning disabled students, given sufficient time and instruction. In addition, as in previous research, there is evidence that specific instruction on word identification may improve oral reading, and as well, indirect instruction in the form of various types of text previewing may provide assistance. Furthermore, error correction instructional techniques may facilitate both word recognition and comprehension. Evidence that academically handicapped children may benefit from placement with similar ability peers also is presented in this research.

Recent Investigations Related to Reading Instruction for Learning Disabled Students

Students having learning disabilities are a continuing problem for educators. Despite 3 decades or more of concern for these children and youth, special educators still seek solutions to problems of remediation in learning disabilities (LD) classrooms. Moreover, because of the current trend toward mainstreaming (Guralnick & Groom, 1988; Johnson & Johnson, 1986; Salend, 1984; Zigmond & Baker, 1990) and the Regular Education Initiative (Byrnes, 1990; Davis, 1989; Davis, 1990; Jenkins & Pious, 1991; Jenkins, Pious, & Jewell, 1990; Thousand & Villa, 1991) LD students increasingly are spending part or most of their school days in regular classrooms, and thus, regular classroom teachers, too, need to be apprised of effective instructional interventions for this population.

Reading disabilities, in particular, are a major problem with elementary, as well as, secondary school learning disabled students (Ip & McCormick, 1989-90). Though word recognition problems are prevalent, comprehension problems also are widespread at the elementary, and especially secondary level. Beginning at about fourth-grade level, complex text patterns, the need for prior knowledge, and requirements for abstract reasoning place increased comprehension demands on students. Special educators and regular classroom teachers need familiarity with

research related to reading and the learning disabled. Studies reviewed in this article directly address the needs of classroom teachers working with these students.

To compile the present review, current investigations related to reading instruction of learning disabled students were examined in the two major journals of the learning disabilities field, Learning Disability Quarterly and Journal of Learning Disabilities. The present article provides a review of all data-based, ecologically-valid studies published in these two journals during the 10-year period from 1980 to 1990 that are related to three general areas of consideration. The review first examines studies focusing on comprehension, including such reader factors as prior knowledge, metacognition, and visual imagery. It then examines studies focusing on text factors, for example, advanced organizers and illustrations. Finally, studies related to word identification and oral reading are discussed.

Comprehension

Reader Factors

Table 1 presents an overview of the studies related to reader factors in comprehension included in this review, along with a summary of their findings.

Insert Table 1 about here

Prior knowledge. There is considerable research supporting the idea that successful readers supplement text with inferences taken from their own prior knowledge. Authors construct texts with the expectation that readers will fill gaps in the text from their own background experiences. This allows authors to omit trivial facts that would make the text unduly tedious to read, and to focus instead on important ideas (Mason & Au, 1986). Readers activate their prior knowledge through selection of appropriate schemata, or cognitive structures, before reading, enabling them to interpret the text. During and after reading, the schemata are elaborated upon based on new information received from the text (Weisberg, 1988). Three studies related to prior knowledge and comprehension of learning disabled students, published during the last 10 years, were identified during this review. In this research subjects were pre-adolescent and adolescent learning disabled children with significant disrepancies between ability and school achievement in one or more academic areas. All students in these investigations had IQs within the normal range.

In the first of these studies, conducted with 36 children, ages 9.0-12.9, classified as learning disabled (LD), Sachs (1983) examined effects of three prereading activities on learning disabled children's reading comprehension. The prereading activities included (a) a modified Directed Reading Activity (DRA), (b) a modified Concept Analysis Activity (CAA), and (c) a

Worksheet Activity (control). The modified DRA consisted of four steps: (a) activating the children's interest by asking them to select the illustration in the text that they found most interesting, (b) displaying pictures related to the content of the story and giving the students the opportunity to think about their experiences which relate to the story, (c) presenting five vocabulary words in context and allowing the children to use the words in sentences of their own and a 5-minute question-answer session concentrating on the main idea of the story, (d) asking the child to predict what the story is about after the examiner reads the title of the story out loud. The modified CAA attempts to increase the child's understanding of the main idea of the story, drawing on his/her past experience and background knowledge. The CAA condition consists of four steps: (a) the examiner writes the central concept of the story on a sheet of paper for the child to view, (b) the examiner and the child develop and list examples of the concept, (c) a list of nonexamples is generated, (d) the child is asked to develop a definition of the concept based on the lists of examples and nonexamples. Finally, during the Worksheet Activity condition the examiner and the student jointly work on three word-analysis worksheets taken from the workbooks for the basal readers used. Results indicated that both the prereading modified Directed Reading Activity and the modified Concept Analysis Activity facilitated reading performance on higher level comprehension

tasks which require relating prior knowledge to narrative text.

Sachs (1984) also examined effects of learning disabled readers' participation in activities designed to access their mental scripts before reading. Twenty-four learning disabled readers (mean age =9.2) were exposed to (a) a plans-and-goals activity and (b) a conceptual-overview statement activity, prior to silent reading of basal stories. Specifically, the plans-and goals activity was a previewing activity in which the teacher asked questions focusing on the plans and goals of the main character in the story. The conceptual-overview statement condition required that the teacher discuss the main goal of the most important character in the story. In this condition the title of the story is read, the main character's name is told to the student, and he/she is given a brief overview of the story. The child then reads the story silently and an oral comprehension test is administered. Results showed activities that invoked prior knowledge of the plans-and-goals of the characters in a story facilitated the ability of the reader to question the goals of the characters and relate them to their own ideas. The plans-and-goals activity was found to affect the children's reading comprehension significantly, supporting the importance of accessing scripts before reading. Findings of this study suggested that the plans-and-goals activity was more beneficial for reading a story than the conceptual overview activity.

In Snider's (1989) work with 13 junior-high school students

having learning disabilities, an experimental group was provided with information and vocabulary concepts to augment prior knowledge. This groups' performance was then compared with a control group having low prior knowledge. Results suggested that not only were students in the experimental group able to increase their prior knowledge as a result of instruction, but reading comprehension performance was increased, as well.

Results of the studies reviewed here suggest that learning disabled students' background knowledge can be increased and that activities that facilitate the activation of prior knowledge improve reading performance of these students.

Metacognition. Good readers monitor their comprehension of text as they read. They are aware when they have failed to understand what they have read and they have strategies for correcting this failure. This awareness and strategy knowledge is referred to as use of metacognition (Mason & Au, 1986). All readers have breakdowns in comprehension and must be taught how to deal successfully with remedying them. These breakdowns, however, are of particular concern with learning disabled students.

Nine studies concerned with metacognitive strategies were identified. In all studies, subjects were learning disabled (often compared with normally achieving students) with IQs of 80 or above. The age range in these investigations was from 8 to 18 years.

Wong and Jones' (1982) research involving 60 learning disabled eighth and ninth graders and 60 normally achieving sixth graders, found differential effects of metacognitive training for the two groups. Sixty of the 120 learning disabled and normally achieving junior-high school students received a 5-step self-questioning training procedure that taught them to monitor their understanding of important textual units. Training substantially increased the learning disabled students' awareness of important textual units, their abilities to form good questions, and improved their comprehension. However, metacomprehension and comprehension were not substantially increased for normally achieving students. Wong and Jones suggested that these results underscore the inactive nature of LD students' reading compared to that of normally achieving students. Normally achieving students may already be monitoring their reading comprehension, lessening effects of additional external training, which may be redundant or even counterproductive.

As in the Wong and Jones (1982) investigation, data from studies by Chan, Cole, and Barfett (1987) and Schumaker, Deshler, Alley, Warner, and Denton (1982) also suggested that specific instruction for using a learning strategy improves performance in comprehension monitoring and comprehension for learning disabled students. In the Chan, Cole, and Barfett (1987) research the finding that specific- and general-instructional conditions had

similar effects on comprehension monitoring for the normally achieving students, however, was in contrast to Wong and Jones, as well as certain other studies. A number of other investigations suggest that cognitive strategy training may improve learning disabled students' performance in and awareness of strategies and their reading comprehension performance (Bos & Anders, 1990; Brailsford, Snart, & Das, 1984; Graves & Levin, 1989; Holmes, 1985; Manning, 1984; Rottman & Cross, 1990). These studies involving elementary, middle school, and junior high school students have shown positive results for a monitoring (self-questioning) strategy; mnemonic ("keyword method") strategy; interactive strategies (i.e., semantic mapping, semantic feature analysis, and semantic/syntactic feature analysis); simultaneous and successive synthesis with verbalization of the child during task performance; cognitive monitoring and creative problem solving; and a directive inferencing strategy using sequenced materials.

The studies examined for the present paper suggest that learning disabled students can be taught to use learning strategies and can benefit from such training, whereas this training in certain cases may be less effective for normally achieving students who may already be employing these or similar strategies.

Visual imagery. In three inquiries with learning disabled adolescents (Mastropieri, Scruggs, & Fulk, 1990; Mastropieri,

Scruggs, Levin, Gaffney, & McLoone, 1985; Scruggs & Mastropieri, 1989) a keyword method of teaching vocabulary was investigated. In this mnemonic technique, visual imagery using acoustically similar words is used. For example, to learn that a paleontologist is a specialist in the science that deals with the life of past geological periods as known from fossils, we could provide learners with the acoustically similar word, pail. Pail sounds like the initial portion of paleontologist and is easily pictured. A picture could be shown of a pail of rocks with fossil remains. Learners are instructed to think of the keyword, pail, and then to think of the picture of the pail and whatever else is in the picture. This should help them to remember the meaning of paleontologist. Scruggs, Mastropieri, Levin, and Gaffney (1985) refer to these three steps involving stimulus Recoding, semantic Relating, and systematic Retrieving as the "three R's" of mnemonic keyword instruction. Results of this research suggest that direct mnemonic instruction improves performance of adolescent learning disabled students on both concrete and abstract words for recall as well as comprehension of low frequency English vocabulary words.

Studies with younger learning disabled students (Chan, Cole, & Morris, 1990; Clark, Deshler, Schumaker, Alley, & Warner, 1984; Rose, Cundick, & Higbee, 1983) also have shown that visual imagery training facilitates comprehension performance. However, it was noted by Chan, Cole, and Morris (1990) that adequate time

and practice are needed to master the use of this strategy. Furthermore, a verbal rehearsal strategy may be even more effective than the visual imagery technique (Rose, Cundick, & Higbee, 1983). Clark, Deshler, Schumaker, Alley, and Warner (1984) demonstrated that a both a visual imagery strategy and a self-questioning strategy were effective in improving reading comprehension.

In summary, this research suggests that visual imagery training (e.g., direct mnemonic instruction) may benefit learning disabled students' word meaning recall and comprehension performance, with adequate time and practice.

Text Factors

Nine studies in the last 10 years related to text factors and their influences on comprehension of learning disabled students were identified in this literature review. Five of these were concerned with text organizers (advanced organizers, story mapping, story grammar instruction, and graphic representations of textbook material). Four were related to illustrations. Across the studies subjects ranged from grade 2 through grade 12. Table 2 presents an overview of the studies related to text factors in comprehension included in this review.

Insert Table 2 about here

Text organizers. Research investigating effects of advanced organizers on reading comprehension of learning disabled students suggests that this type of textual organization may be beneficial. In a study by Darch and Gersten (1986) 24 learning disabled high school students were randomly assigned to one of two instructional groups. The first group received a traditional basal reader approach to reading. The second group received instruction using an advanced organizer consisting of an outline of the text. Results indicated that the group receiving instruction with the advanced organizer significantly outperformed the basal reader instruction group.

Idol-Maestas (1985) used an advanced organizer she labeled "TELLS Fact or Fiction" with 4 learning disabled students, ages 12.6, 9.9, 9.7, and 8.6 years. This advanced organizer with its acronym consisted of the following steps: T = study selection titles; E = examine and skim pages for clues as to what selections are about; L = look for important words; L = look for hard words;, S = think about the settings of the selections; and Fact or Fiction = decide whether the selections are factual or fictional. Results indicated that while use of this advanced organizer (including performance on factual, sequential, and inferential questions) improved performance on reading comprehension for all 4 students, the 2 younger students were unable to maintain their improvement after teacher assistance was removed, suggesting need for continued instruction to maintain

improvement with younger, poor readers.

Use of story mapping and a story grammar technique were examined in studies by Idol and Croll (1987) and by Gurney, Gersten, Dimino, and Carnine (1990), respectively. In Idol and Croll's study with LD students ages 9-12, an outline of story-mapping components (i.e., setting, problem, goal, action, and outcome) was presented before reading and this map filled in as the reading progressed, first with teacher assistance and then independently. Gurney et al. (1990) taught 7 special education high school students (classified as LD) the use of a story grammar technique employing modeling, guided practice, and independent practice. Students in the latter study were guided through identification of the four major story grammar components (i.e., identifying the main problem/conflict, character clues, resolution, and theme) and then gradually lead toward independent use of this technique. Results of these investigations indicate that story mapping and story grammar instruction are useful for learning disabled students. In the Idol and Croll (1987) study, all readers' comprehension improved and 4 of 5 students were able to maintain improvement even when no longer required to use story mapping. Story grammar instruction (Gurney, et al, 1990) also enabled students to improve comprehension by providing a framework or schemata they could relate to new reading material. In both investigations, overall, results suggested improvement in ability to answer comprehension questions for most students.

Bergerud, Lovitt, and Horton (1988) examined effects of using graphics (i.e., charts, diagrams, and graphs) and study guides (structured questions and answers) with secondary students having learning disabilities. In the graphics condition, each student was instructed to read a passage from a life science text. Students were then given a diagram to fill in or label. They were then shown a completed diagram and answers were discussed one at a time. Graphic representations of the science textbook material improved performance on a retention measure, compared to use of a study guide or self-study.

In summary, results of these studies suggest that text organizers, by activating prior knowledge, improve comprehension performance of some learning disabled students. Maintained performance was only observed for secondary students on inferential questions, however; therefore, younger poor readers may need continuing guidance to sustain improvement. According to Idol-Maestas (1985), this suggests that secondary students possess more metacognitive knowledge about when to use strategies, than younger students.

Illustrations. In several studies with children ages 8 through 12, that examined effects of illustrations on learning disabled students' reading comprehension performance, it was found that illustrations were related to lower performance (e.g., Harber, 1983; Rose, 1986; Rose & Furr, 1984). For example, in the Harber (1983) study with second through fourth graders though

illustrations were found to have a beneficial effect for normally achieving students, this was not the case with the LD subjects. These researchers hypothesized that the additional visual cues supplied by illustrations may distract LD children's attention from the printed text. In contrast, Rose and Robinson's (1984) research with LD subjects showed no relationship between the presence or absence of illustrations and word recognition in oral reading or reading comprehension. And, as cited in the previous section, other investigators have found the keyword method to be effective when specially constructed mnemonic illustrations are provided (Mastropieri, Scruggs, Levin, Gaffney, & McLoone, 1985).

Based on the mixed results of these studies, it appears that additional research is needed to determine more conclusively the effects of illustrations for improving reading comprehension (or word recognition) for this population.

Word Identification and Oral Reading

Sixteen studies concerning word identification and oral reading are included in this review. Four of these also examined effects of their targeted treatments on comprehension and the link between oral reading and comprehension performance. All subjects in these investigations were identified as learning disabled. In most studies, students were of average intelligence, but in one investigation the researcher selected subjects from a pool in which students' IQs were as low as 70.

Students were in first grade through ninth grade; however, one study addressed the needs of a 21-year-old adult. An overview of the studies related to word identification and oral reading is presented in Table 3.

Insert Table 3 about here

Direct Instruction

Recent research, as has been the case in earlier studies related to oral reading performance of learning disabled readers, indicates direct word identification instruction is beneficial to these students (DiVeta & Speece, 1990; Henderson & Shores, 1982; Idol-Maestas, 1981). When Idol-Maestas (1981) used direct phonics instruction in a tutorial setting this procedure significantly improved the oral reading of a 21-year-old learning disabled adult male, though review and reinforcement were needed to maintain improvement. Henderson and Shores' (1982) research with 9-year-old learning disabled boys, indicated that oral reading performance improved with training on inflectional endings comprised of instruction on verb suffixes. Students were presented with a sentence using each of five verbs. The verb was omitted and two verb choices, past tense (-ed) and progressive (-ing) were given. Students were told to read the sentence and underline the correct word. Students were given daily feedback

and praise about correct choices. They were told only whether their choice was correct, nothing more. They concluded that specific, structured teaching of suffixes seems useful for learning disabled children when the goal is to improve oral reading performance. Likewise, DiVeta and Speece (1990) found blending and spelling training useful with 2 first-grade, learning disabled boys. In blending training the word was presented in a CVC pattern on letter tiles, with the final consonant separated from the first two letters. The student was taught to pronounce the first two phonemes as a unit and then add the letter tile of the last one, as the last letter was physically pushed toward the first two. During spelling training the experimenter pronounced the word, the child repeated it and chose letter tiles representing each letter, then he/she pronounced the sound of each letter chosen. Results indicated that the two conditions were equally successful in improving the students' decoding skills.

Fleisher and Jenkins' (1983) research compared the effects of three approaches to reading instruction: word-emphasis (a word-drill correction procedure), comprehension emphasis (comprehension questioning), and word-emphasis plus comprehension-emphasis (a combination of the two). Reading comprehension was not found to be differentially affected by the three treatments. They concluded that while the word-drill correction approach (comprised of correction of all reading

errors and word drills until all words were read successfully) did not interfere with comprehension, but neither did it appreciably improve contextual word recognition nor comprehension. Fleisher and Jenkins concluded, however, when data for individual students were examined, that poorer readers (i.e., students who read correctly less than 50% of the words presented at pretest and who were less able to use context to facilitate word recognition) tended to benefit more from this approach.

Jenkins, Larson, and Fleisher (1983), as well as, Rosenberg (1986) compared the effects on oral reading of two error-correction instructional techniques, Word Supply and Drill. For the control passages, the Word Supply procedure was used. In this technique the teacher pronounced the student's incorrect words correctly and the student then repeated the word before continuing his/her reading. For the experimental passages, a multi-step Drill procedure was used. In this technique, a student's incorrect words first were corrected using the Word Supply method and the words were then printed on an index card. After completing reading of the passage these cards were presented for the student to read. The teacher correctly pronounced each word missed and the student repeated it, twice. Words were then presented until all error words from a given passage could be correctly stated on two consecutive unaided trials. Results provided evidence that the Drill procedure was

more effective than the Word Supply technique. The Jenkins et al. (1983) study found that drill correction also significantly enhanced comprehension of sentences containing the original error words. Rose, McEntire, and Dowdy's (1982) work, as well, suggests that systematic error-correction procedures improve oral reading and that the Word Supply method which was also used by Jenkins et al. (1983) and Rosenberg (1986) appears more effective than phonic analysis or the "sound-out" approach.

Pany and McCoy (1988) found corrective feedback on all oral reading errors had a significant positive effect on both word recognition accuracy and comprehension when compared to correction on meaning change errors only or no feedback. This is consistent with information processing studies that show accurate word recognition is necessary to facilitate comprehension. This study also confirmed Fleisher and Jenkins'(1983) findings that corrective feedback does not seem to impede comprehension. Another study which supports the positive effects of error correction for poor readers, at least for isolated words, is Lenz and Hughes' (1990) work. A word identification strategy, they called DISSECT (a seven-step procedure focusing on using the context surrounding the word, breaking the word into parts, and using resources such as the teacher or a dictionary) was effective in reducing oral reading errors for 12 learning disabled adolescents; not all subjects consistently made gains in their comprehension scores, however.

Perkins' (1988) research with 48 boys in grades one through four indicated that any type of feedback showed significantly positive differences, compared to no feedback, for improving oral reading performance. He also found, in contrast to other researchers' evidence, that corrective feedback techniques such as modeling and sounding-out produced the highest correct response rates.

Indirect Instruction

Investigations identified in this literature review also show that indirect word identification instruction is efficacious with learning disabled subjects.

Four studies with LD students, ages 8 through 16, investigated effects of oral reading previewing or prepractice involving both silent reading and listening procedures (Rose, 1984; Rose & Beattie, 1986; Rose & Sherry, 1984; Salend & Nowak, 1988). In three of these investigations by Rose and colleagues, students listened as the teacher read the selection or the student silently read the passage prior to reading aloud. In the Salend and Nowak study, a peer previewing system was employed in which the peer previewer read the story aloud while the targeted student listened. The targeted student then read the same passage orally to a teacher. All three procedures were associated with higher rates of words read correctly. Listening procedures were superior to silent reading procedures, however.

In general then, these recent studies related to word

identification and oral reading imply that specific instruction on word identification, including previewing and prepractice, as well as structured teaching of phonic analysis, structural analysis, and spelling, may improve oral reading for some learning disabled students. Error correction instructional techniques (e.g., drill procedures, word supply, and corrective feedback on oral reading errors) can have a positive effect on word recognition, and may facilitate comprehension, as well. In addition, Armstrong's (1983) research showed for third and fourth grade LD subjects, that higher oral reading rates were associated with greater comprehension. These findings also suggested that programs to improve word identification and oral reading skill may assist LD students with understanding of material read.

Other Research

A final exploration in the present literature review, (Gottlieb, 1984), with 26 learning disabled children, found evidence that students who read with similar-ability peers performed significantly better than when they read with peers of superior ability. Gottlieb suggested that anticipated criticism in the presence of able peers resulted in incorrect responses. This is in contrast to praise anticipated from performance in the presence of similar-ability peers, resulting in greater self-confidence and, in turn, more correct responses. Gottleib believes this is an effect of perceived evaluation that impacts

on the child as a classically conditioned response. The child expects a stricter set of evaluation criteria when performing in a group of superior-ability peers and this expectation results in an increased likelihood of an error. This study may indicate that placement of academically handicapped students with superior-ability students may, therefore, depress achievement.

Insert Table 4 about here

Summary

In this review of two major journals in the field of learning disabilities, major findings included the following:

1. Background knowledge can be increased before reading and may result in improved comprehension for learning disabled students.

2. Metacognitive training, especially training that entails specific instruction, improves performance in comprehension monitoring and comprehension for learning disabled students.

3. Visual imagery training may improve performance for learning disabled students on both word meaning recall and comprehension, given sufficient time and training.

4. Text organizers may benefit learning disabled students in comprehending text, but continued support probably is needed for younger readers to maintain the improvement.

5. Illustrations may or may not be related to lower performance in reading comprehension for learning disabled students. Research in this area appears to be somewhat conflicting, and sparse. Additional data is needed.

6. Direct word identification instruction (e.g., structured teaching of word analysis and corrective feedback) is beneficial to some learning disabled students' oral reading.

7. Indirect word identification instruction (e.g., previewing and prepractice activities) are associated with higher rates of words read correctly during oral reading for learning disabled students.

8. Improvement in oral reading rates may produce similar increases in comprehension performance for some learning disabled students.

9. Academically handicapped children may benefit from placement with similar-ability peers.

These studies have important implications for instruction and raise questions to be addressed by future research as well. The strategies suggested by data from investigations reviewed here must be used by a variety of students and teachers in a variety of contexts. Two questions should be asked: (a) Will these practices be effective with LD students with different subject characteristics (e.g., different ages, reading levels, etc.) than those employed in the presently reviewed research? and (b) Will these practices be effective and feasible in diverse

situations and settings? In planning classroom instruction it is important that findings from this research be carefully and thoughtfully used so that learning disabled students may reach their full potential.

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Table 1

Overview of Studies Related to Comprehension: Reader Factors

PRIOR KNOWLEDGE

Reference	Research Design	Subjects	Length of Intervention	Results
Sachs, 1983	Experimental; random assignment to three treatment groups; all students exposed to all treatments, tests, & experimenters	38 LD students; mean age 10.8; ages 9.0-12.9; mean IQ 99 on WISC-R; IQs ranged from 83-105; reading comprehension on PIAT between 2nd & 25th percentile	Three 45 min. individual instructional sessions	Evaluative reading comprehension was affected by a Modified Concept Analysis and Modified Directed Reading Activity more than a Worksheet Activity.
Sachs, 1984	Single-subjects alternating treatments design; random assignment to two treatment groups	24 LD children mean age 9.2; IQs within normal range; reading grade level scores beginning 2nd to beginning 3rd grade	2 sessions/30-45 min., each	The plans-and goals activity to access scripts had a significant effect on reading comprehension, supporting the importance of acquiring scriptal knowledge before reading.

Note. WISC-R = Wechsler Intelligence Scale for Children-Revised; PIAT = Peabody Individual Achievement Test; CCAT = Canadian Cognitive Abilities Test; SRI = Standard Reading Inventory; GMRT = Gates-MacGinitie Reading Test; BTBC = Boehm Test of Basic Concepts; CAT = California Achievement Test; DRS = Diagnostic Reading Scales; WJPEB = Woodcock-Johnson Psycho-Educational Battery; WRAT = Wide Range Achievement Test

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Table 1 *Continued*

Overview of Studies Related to Comprehension: Reader Factors

Reference	Research Design	Subjects	Length of Intervention	Results
PRIOR KNOWLEDGE				
Snider, 1989	Quasi-experimental; control group	26 LD students; IQs 85 & up on WISC-R; sufficient decoding skill to read at beginning 4th grade level at 120 words per minute with 95% word recognition accuracy	3 weeks; 50 min./day	Indicated that the experimental group increased their prior knowledge and as a result of instruction, showed superior reading comprehension performance. The control group whose prior knowledge was limited showed poor comprehension in spite of fluent decoding and average intelligence.
METACOGNITIVE STRATEGIES				
Schumaker, Deshler, Alley, Warner & Denton, 1982	Multiple-baseline design across three substrategies, replicated eight times	8 LD students; ages 14-18; IQs 80-107; reading achievement grade level scores 4.3-7.3	4 1/2 to 11 1/2 hrs. per student	Concluded that LD adolescents can be taught to use a complex learning strategy. Grades on tests covering textbook material improved markedly.

Note. WISC-R = Wechsler Intelligence Scale for Children-Revised; PIAT = Peabody Individual Achievement Test; CCAT = Canadian Cognitive Abilities Test; SRI = Standard Reading Inventory; GMRT = Gates-MacGinitie Reading Test; BTBC = Boehm Test of Basic Concepts; CAT = California Achievement Test; DRS = Diagnostic Reading Scales; WJPEB = Woodcock-Johnson Psycho-Educational Battery; WRAT = Wide Range Achievement Test

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Overview of Studies Related to Comprehension: Reader Factors

METACOGNITIVE STRATEGIES

Reference	Research Design	Subjects	Length of Intervention	Results
Wong & Jones, 1982	Experimental	60 LD students; 9th graders; mean age 14.1; 60 normally achieving students; 6th graders, mean age 12.0	3/1 hr. sessions; 2/2 hr. sessions; 4/1 sessions	Showed that the self-questioning training in which they learned to monitor their understanding of text significantly increased LD adolescents' ability to form good questions, their awareness of textual units, and their comprehension performance. Training did not substantially increase metacomprehension or comprehension performance of normally achieving sixth graders.
Brailsford, Snart, & Das, 1984	Experimental	24 LD students; ages 9-12; IQs 85 & up on CCAT; reading level: experimental group 2.83 & control group 3.25	15 hours; 30 min./day	The experimental group achieved significantly higher reading levels on four of the cognitive tests and on the instructional reading levels on the SRI.

Note. WISC-R = Wechsler Intelligence Scale for Children-Revised; PIAT = Peabody Individual Achievement Test; CCAT = Canadian Cognitive Abilities Test; SRI = Standard Reading Inventory; GMRT = Gates-MacGinitie Reading Test; BTBC = Boehm Test of Basic Concepts; CAT = California Achievement Test; DRS = Diagnostic Reading Scales; WJPEB = Woodcock-Johnson Psycho-Educational Battery; WRAT = Wide Range Achievement Test

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Table 1 *Continued*

Overview of Studies Related to Comprehension: Reader Factors

METACOGNITIVE STRATEGIES				
Reference	Research Design	Subjects	Length of Intervention	Results
Manning, 1984	Random assignment to one of four conditions; experimental; group	100 subjects; 3rd graders; average IQs; reading level: 1.1-1.5 on GMRT	10 days; 30 min./day	All three of the training programs aided oral comprehension of reading disabled 3rd graders. Combina-training produced a higher score on BTBC when administered in a group than either cognitive monitoring or creative problem solving, alone.
Holmes, 1985	Random assignment to four groups;	24 subjects; 4th & 5th graders; 2 or more years below grade level on the CAT & the DRS	Eight 20 min. sessions	Suggested that a strategy may be enhanced by use of materials sequentially arranged from easy to difficult. Suggested poor readers in intermediate grades can improve inferential comprehension through a direct systematic strategy and sequential materials.

Note. WISC-R = Wechsler Intelligence Scale for Children-Revised; PIAT = Peabody Individual Achievement Test; CCAT = Canadian Cognitive Abilities Test; SRI = Standard Reading Inventory; GMRT = Gates-MacGinitie Reading Test; BTBC = Boehm Test of Basic Concepts; CAT = California Achievement Test; DRS = Diagnostic Reading Scales; WJPEB = Woodcock-Johnson Psycho-Educational Battery; WRAT = Wide Range Achievement Test

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Table 1 *Continued*

Overview of Studies Related to Comprehension: Reader Factors

METACOGNITIVE STRATEGIES

Reference	Research Design	Subjects	Length of Intervention	Results
Chan, Cole & Barfett, 1987	Experimental; group	32 LD children; mean age 11 yrs.; mean IQ 94.74; reading level 91.06 months; 32 Regular class students: mean age 8.2 yrs.; reading level 92.84 months	One individual session/student	Explicit rather than general instruction in the use of a cross-referencing evaluative technique yielded higher performance in comprehension monitoring and reading comprehension in LD students. This was not true for regular students.
Graves, & Levin 1989	Experimental; group	30 LD students; grades 5-8; mean IQ 92.9 on WISC-R; mean PIAT reading score 3.5	One individual training session, 75 min./ student; recall test one week later	The monitoring strategy was most effective for main-idea finding, whereas the mnemonic strategy was most effective for main-idea remembering and identifying.

Note. WISC-R = Wechsler Intelligence Scale for Children-Revised; PIAT = Peabody Individual Achievement Test; CCAT = Canadian Cognitive Abilities Test; SRI = Standard Reading Inventory; GMRT = Gates-MacGinitie Reading Test; BTBC = Boehm Test of Basic Concepts; CAT = California Achievement Test; DRS = Diagnostic Reading Scales; WJPEB = Woodcock-Johnson Psycho-Educational Battery; WRAT = Wide Range Achievement Test

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Table 1 *Continued*

Overview of Studies Related to Comprehension: Reader Factors

METACOGNITIVE STRATEGIES				
Reference	Research Design	Subjects	Length of Intervention	Results
Bos & Anders, 1990	Four instructional conditions; posttest & follow-up	61 LD students; mean age 13.8; IQs 85 & up; mean IQ 91.97; mean reading score 81.30 on the WJPEB	Eight 50 min. sessions over 7 weeks	Indicated that students participating in three interactive vocabulary strategies showed greater comprehension and vocabulary learning than students receiving definition instruction. This study supports the notion that rich, elaborative vocabulary instruction facilitates reading comprehension for LD students.
Rottman & Cross, 1990	Cross-sectional time series design; Pretest/ posttest	18 LD students; ages 8-9; IQs ranged from 100-115; reading achievement at least two grades below age place-	5 weeks; three 45 min. lessons per week	Preliminary evidence that a metacognitive reading program may improve LD students' awareness about reading and their comprehension skills.

Note. WISC-R = Wechsler Intelligence Scale for Children-Revised; PIAT = Peabody Individual Achievement Test; CCAT = Canadian Cognitive Abilities Test; SRI = Standard Reading Inventory; GMRT = Gates-MacGinitie Reading Test; BTBC = Boehm Test of Basic Concepts; CAT = California Achievement Test; DRS = Diagnostic Reading Scales; WJPEB = Woodcock-Johnson Psycho-Educational Battery; WRAT = Wide Range Achievement Test

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Overview of Studies Related to Comprehension: Reader Factors

VISUAL IMAGERY

Reference	Research Design	Subjects	Length of Intervention	Results
Rose, Cundick, & Higbee, 1983	Random assignment to three treatment groups; experimental	30 LD children; mean age 8.9; mean IQ 95.6; mean reading comprehension grade equivalent 2.2	Two 30 min. sessions in Exp. 1; 7 sessions (on average) unaided instruction; 5 sessions mnemonic instruction; 5 additional sessions unaided instruction, not using mnemonic strategy & reading without stopping.	LD children significantly increased reading comprehension after brief training in mnemonic strategies. Verbal rehearsal seemed more effective than visual imagery with young LD children.
Clark, Deshler, Schumaker, Alley, & Warner, 1984	Multiple-baseline design across the two strategies for each student	6 LD students; ages 13.7-17.7; IQs 81-103; reading achievement grade level scores 4.1-7.3	Two strategies taught 5-7 hrs., each	Indicated that LD students can learn the two strategies and apply them, resulting in greater comprehension scores from pretest in baseline to the posttest after training.
Mastropieri, Scruggs, Levin, Gaffney, & McLoone, 1985	Stratified random assignment to two treatment conditions; experimental; group	32 LD students; 7th -9th graders; mean age 13.11; IQs ranged from 80-115; mean IQ 95.6; mean CAT reading percentile score 24.9	One individual session per student for each experiment	Suggested that keyword vocabulary instruction is more effective than direct instruction, even when students are required to generate their own mnemonic images.

Note. WISC-R = Wechsler Intelligence Scale for Children-Revised; PIAT = Peabody Individual Achievement Test; CCAT = Canadian Cognitive Abilities Test; SRI = Standard Reading Inventory; GMRT = Gates-MacGinitie Reading Test; BTBC = Boehm Test of Basic Concepts; CAT = California Achievement Test; DRS = Diagnostic Reading Scales; WJPEB = Woodcock-Johnson Psycho-Educational Battery; WRAT = Wide Range Achievement Test

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Table 1 *Continued*

Overview of Studies Related to Comprehension: Reader Factors

VISUAL IMAGERY

Reference	Research Design	Subjects	Length of Intervention	Results
Scruggs & Mastropieri, 1989	Alternated mnemonic instruction with traditional instruction, using an ABAB design	20 LD subjects; 7th & 8th grade; mean age 13.8; average to low average IQs; mean reading grade 4.98 on the WRAT	8 weeks; 50 min./day	Suggested that mnemonic materials can substantially improve LD students' content-area learning.
Chan, Cole, Morris, 1990	Experimental; group; students randomly assigned to three training conditions	39 RD students: mean age 11.1; mean reading level 7.8; 39 average readers: mean age 7.11; mean reading level 7.6; all IQs within normal range	Four 40 min. sessions	Providing explicit instruction in the use of a visual imagery strategy and providing support by means of pictorial aids facilitatied comprehension performance. However, fading procedures or generalization instruction seem necessary to remove dependence on external support and to promote internalization of strategy use.
Mastropieri, Scruggs, Fulk, 1990	Experimental; stratified, random assignment to 2 treatment groups	25 LD students; mean IQ 92.5 on WISC-R; mean reading grade equivalent 5.0 on WRA	One session about 30 minutes	Indicated that mnemonically trained students outperformed control students on abstract and concrete words and on recall tests and comprehension tests. Suggests LD students learn substantially more concrete words by mnemonic keyword method than by traditional drill and practice methods.

Note. WISC-R = Wechsler Intelligence Scale for Children-Revised; PIAT = Peabody Individual Achievement Test; CCAT = Canadian Cognitive Abilities Test; SRI = Standard Reading Inventory; GMRT = Gates-MacGinitie Reading Test; BTBC = Boehm Test of Basic Concepts; CAT = California Achievement Test; DRS = Diagnostic Reading Scales; WJPEB = Woodcock-Johnson Psycho-Educational Battery; WRAT = Wide Range Achievement Test

Table 2

Overview of Studies Related to Comprehension: Text Factors

TEXT ORGANIZERS

Reference	Research Design	Subjects	Length of Intervention	Results
Idol-Maestas, 1985	ABA design with multiple baseline across 4 subjects; random assignment to length of baseline condition	4 LD students; ages 8.8-12.8; Ginn reading levels 7, 7, 12, & 10 respectively for the 4 subjects	Daily for 3 months	In general, students average performance on factual, sequential, and inferential questions improved when using the advanced organizer, "Tells Fact or Fiction."
Darch & Gersten, 1986	Experimental; random assignment of students to one of two instructional groups; posttest	24 LD high school students; mean IQ 85; mean reading grade placement score of 5.2 on WRMT	Nine 50 min. daily instructional sessions	Indicated that on both dependent measures the advance-organizer group significantly outperformed the basal group.
Idol & Croll, 1987	ABA design with multiple baseline across 5 students	5 LD students; ages 9.5-12.11; mean IQ 88 on WISC-R, for 4 of the 5 subjects; serious comprehension problems	20 min./day	Indicates that imposing a concrete organizational structure on poor comprehenders positively affects ability to identify the structural schemata of stories. All students' performances improved on most of the dependent measures.

Note. WRMT = Woodcock Reading Mastery Test; WISC-R = Wechsler Intelligence Scale for Children-Revised; MAT = Metropolitan Achievement Test; WJPEB = Woodcock-Johnson Psycho-Educational Battery; PMA = Primary Mental Abilities; PIAT = Peabody Individual Achievement Test

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Table 2 *Continued*

Overview of Studies Related to Comprehension: Text Factors

TEXT ORGANIZERS

Reference	Research Design	Subjects	Length of Intervention	Results
Bergerud, Lovitt, & Horton, 1988	Quasi- experimental; each class was exposed to each treatment and to each passage	49 LD students; 9-12th graders; normal IQs; at or below 35th percentile on verbal section of most recent achievement test	3 class sessions/class	Indicated that for most students performance on a retention measure following instruction with a graphic representation of the science textbook material was superior to their performance following a study guide or self-study. These results support the use of textbook adaptations with LD secondary students to promote learning of science content.
Gurney, Gersten, Dimino, & Carnine, 1990	Modified multiple baseline design used to assess two instructional methods; AB design	7 LD students; IQs ranged from 83-106 on WISC-R; MAT Reading Comprehension Subtest grade equivalent scores of 3.5, 5.1, 5.9, 8.9, 10.4, 4.7, & 8.9; scores on WJPEB 4.3-11.4	Daily sessions for one month	Suggested that story grammar instruction can improve the ability of LD students to comprehend important elements in short stories in high school literature anthologies.

Note. WRMT = Woodcock Reading Mastery Test; WISC-R = Wechsler Intelligence Scale for Children-Revised; MAT = Metropolitan Achievement Test; WJPEB = Woodcock-Johnson Psycho-Educational Battery; PMA = Primary Mental Abilities; PIAT = Peabody Individual Achievement Test

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Table 2 *Continued*

Overview of Studies Related to Comprehension: Text Factors

ILLUSTRATIONS

Reference	Research Design	Subjects	Length of Intervention	Results
Harber, 1983	Subjects assigned to three groups based on reading scores; all groups received all three treatments	52 LD students; 2nd-4th graders; mean age 113.85 months; mean IQ 95.08 on PMA; 24 normally achieving students; mean age 93.08; mean IQ 100.96	Two months	Illustrations were found to exert a detrimental effect on LD subjects performance, but a beneficial effect on the performance of normally achieving subjects.
Rose & Furr, 1984	Multiple-baseline AB design across students	4 students; ages 8.6-11.3; low average IQs on the WISC-R; 2 to 4 years behind academically	25 to 30 daily instructional sessions	Indicated illustrations were related to lower reading performance rates and that illustrations interfered with acquisition of new words in isolation by disabled readers.
Rose & Robinson, 1984	Alternating treatments	5 LD students; ages 8-10	Daily sessions	Suggested an ambiguous relationship between illustrations and comprehension. Use of illustrations to enhance comprehension or word recognition seems to be an inefficient strategy.
Rose, 1986	Each student tested on an illustrated or non-illustrated passage for comprehension; passages given in random order	32 LD students; ages 9.3-12.8; IQs within the normal range; reading 2.3-4.1 levels below expected performance on Reading Comprehension Subtest of the PIAT	One session per student	Suggested that elementary aged readers who are LD comprehended nonillustrated reading passages significantly better than illustrated passages.

Note. WRMT = Woodcock Reading Mastery Test; WISC-R = Wechsler Intelligence Scale for Children-Revised; MAT = Metropolitan Achievement Test; WJPEB = Woodcock-Johnson Psycho-Educational Battery; PMA = Primary Mental Abilities; PIAT = Peabody Individual Achievement Test

Table 3

Overview of Studies Related to Word Identification and Oral Reading

DIRECT INSTRUCTION

Reference	Research Design	Subjects	Length of Intervention	Results
Idol-Maestas, 1981	Multiple-baseline design	One male subject; 21 years of age; normal IQ; S-ARPI: Independent level at 2nd grade and instructional level at 3rd grade	Three months	The use of direct phonics instruction in a tutorial setting produced significant gains in oral reading.
Henderson & Shores, 1982	Multiple-baseline design, ABAB, across subjects; a replication phase for each subject	2 LD students; ages 9 years; 2 years below expected grade level in reading comprehension on GORT	At least 7 days/treatment	Suggested that oral reading performance improved when children were trained to correctly read -ed and -ing verb endings.
Rose, McEntire, & Dowdy, 1982	Alternating treatments design	8 LD students; ages 8.7-11.8; IQs within normal range; mean score on GORT-1.4	Daily sessions	Indicated that systematic error correction procedures resulted in improved oral reading performance. The word supply approach appeared to be more effective than phonic analysis, contradicting results of earlier studies.
Armstrong, 1983	Single-subject multi-element baseline design	5 LD students; 3rd & 4th grades; ages 9-10; at least 1 1/2 years discrepancy on the PIAT; deficits in reading comprehension	Daily sessions for 34 days	Suggested that oral reading measures and reading comprehension performance are more strongly linked than previously suggested. Oral reading increases may lead to concomitant increases in comprehension performance.

Note. S-ARPI = Sucher-Allred Reading Placement Inventory; GORT = Gilmore Oral Reading Test; PIAT = Peabody Individual Achievement Test; MAT = Metropolitan Achievement Test; WISC-R = Wechsler Intelligence Scale for Children-Revised; S-BIS = Stanford-Binet Intelligence Scale; WRAT = Wide Range Achievement Test; CAT = California Achievement Test; WJPEB = Woodcock-Johnson Psycho-Educational Battery

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Table 3 *Continued*

Overview of Studies Related to Word Identification and Oral Reading

DIRECT INSTRUCTION

Reference	Research Design	Subjects	Length of Intervention	Results
Fleisher & Jenkins, 1983	Experimental; random assignment to three treatment conditions; pretest/posttest design	21 LD students; 4th & 5th graders; at least one year below grade level in reading comprehension & word recognition accuracy	Eighteen 30 min. sessions	Suggested that students reading comprehension does not suffer from a word-emphasis approach during instruction. No differences found among treatment effects on comprehension and oral reading.
Jenkins, Larson, & Fleisher, 1983	All students alternated between treatment days & meaurement days; all students received experimental & control passages on each treatment day	17 LD students; 3rd-7th graders; significant discrepancy between IQ and achievement; at least 1 year below grade level in reading on the MAT	8 days alternating treatment & measurement	Findings suggest that corrections that differentially affect word recognition can also affect comprehension of text that contain original error words. Drill correction produced significant effects on word recognition compared with Word Supply correction.
Rosenberg, 1986	Two-phased alternating treatments design	4 LD students; ages 12.5-14.3; IQs 78-97 on the WISC-R or S-BIS; reading level 2.4-6.7 on WRAT or PIAT Reading Comprehension	20 instructional sessions for each of two phases	Suggested a drill procedure was more effective than a word-supply procedure and a phonic-drill rehearsal strategy.

Note. S-ARPI = Sucher-Allred Reading Placement Inventory; GORT = Gilmore Oral Reading Test; PIAT = Peabody Individual Achievement Test; MAT = Metropolitan Achievement Test; WISC-R = Wechsler Intelligence Scale for Children-Revised; S-BIS = Stanford-Binet Intelligence Scale; WRAT = Wide Range Achievement Test; CAT = California Achievement Test; WJPEB = Woodcock-Johnson Psycho-Educational Battery

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Table 3 *Continued*

Overview of Studies Related to Word Identification and Oral Reading

DIRECT INSTRUCTION

Reference	Research Design	Subjects	Length of Intervention	Results
Pany & McCoy, 1988	All students read under all three treatment conditions	16 LD students; 3rd graders; between 10th & 35th percentile on CAT-Total Reading	8 days	Corrective feedback on oral reading errors had a significant positive effect on both word recognition accuracy and reading comprehension.
Perkins, 1988	Quasi-experimental; Random assignment to 4 treatment groups; pretest/posttest/follow-up test	48 LD students; 1st-4th graders; normal IQs; 12-18 month discrepancy between ability and achievement	3 sessions over a 3-week period	Supports findings in previous studies with LD students indicating that feedback correction procedures result in improved oral reading. Any type of feedback was superior to no feedback. Corrective techniques of modeling and sounding out produce highest correct response rates.
Diveta & Speece, 1990	Single-subject alternating treatments design	2 students; 1st graders; ages 7.4 & 6.8; severe discrepancy between IQ and achievement; poor readers	2 pretrainings for each treatment; 2 nonreinforced trials followed; ten 25 min. sessions, 1/day; 2 posttraining test sessions at 1 and 2 weeks after training sessions ended	Both subjects reached the learning criterion for blending and spelling conditions at approximately the same time. This indicates that neither treatment was superior to the other in enhancing decoding skills of children in the phonetic cue stage of reading development.

Note. S-ARPI = Sucher-Allred Reading Placement Inventory; GORT = Gilmore Oral Reading Test; PIAT = Peabody Individual Achievement Test; MAT = Metropolitan Achievement Test; WISC-R = Wechsler Intelligence Scale for Children-Revised; S-BIS = Stanford-Binet Intelligence Scale; WRAT = Wide Range Achievement Test; CAT = California Achievement Test; WJPEB = Woodcock-Johnson Psycho-Educational Battery

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Table 3 *Continued*

Overview of Studies Related to Word Identification and Oral Reading

DIRECT INSTRUCTION

Reference	Research Design	Subjects	Length of Intervention	Results
Lenz & Hughes, 1990	Multiple-baseline across subjects design; replicated 3 times; 3 subjects participated in	12 LD subjects; 7th-8th graders; ages 13-15; IQs 82-113 on WISC-R; reading level of 3.5-7.0 on the WJPEB	3 days/week for 6 weeks; 20-25 min./session	Training in a word identification strategy was effective in reducing common oral reading errors.

INDIRECT INSTRUCTION

Reference	Research Design	Subjects	Length of Intervention	Results
Rose, 1984	Alternating treatments design	6 LD students; ages 9.6-13.2; within -1.5 SD on the WISC-R; GORT scores between 1.4-2.8	Daily sessions for approximately 30 days	Systematic prepractice procedures were related to higher performance levels than baselines (no prepractice). The listening procedure was related to higher rates of words read correctly than the silent procedure.
Rose & Sherry, 1984	Alternating treatments; baseline design	5 LD students; ages 14-16; IQs 85-92 on WISC-R; at least 4 years behind in academic achievement	Approximately 35 school days	Four out of five cases showed that systematic prepractice was related to higher performance levels than no practice (baseline). A listening procedure was related to higher rates of words read correctly than a silent procedure.

Note. S-ARPI = Sucher-Allred Reading Placement Inventory; GORT = Gilmore Oral Reading Test; PIAT = Peabody Individual Achievement Test; MAT = Metropolitan Achievement Test; WISC-R = Wechsler Intelligence Scale for Children-Revised; S-BIS = Stanford-Binet Intelligence Scale; WRAT = Wide Range Achievement Test; CAT = California Achievement Test; WJPEB = Woodcock-Johnson Psycho-Educational Battery

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Table 3 *Continued*

Overview of Studies Related to Word Identification and Oral Reading

INDIRECT INSTRUCTION

Reference	Research Design	Subjects	Length of Intervention	Results
Rose & Beattie, 1986	Alternating treatments design	4 LD students; ages 8.7-11.8; IQs within -1.5 SD on WISC-R; score on PIAT Reading Recognition Subtest 1.5-3.3	3-4 min. sessions every day/35 days	Systematic previewing procedures were found to be related to higher performance levels on oral reading. The listening procedure was differentially related to higher rates of words read correctly.
Salend & Nowak, 1988	Multiple-baseline design across subjects; alternating treatments	6 LD students; 50% or more discrepancy between expected & actual achievement; subjects aged 8.3, 9.4, & 9.4; IQs 89-105 for subjects, WISC-R; IQs 81-96 for previewers	Fifteen 5 min. treatment sessions	Suggests peer previewing is effective for increasing oral reading skills of elementary level LD students.

Note. S-ARPI = Sucher-Allred Reading Placement Inventory; GORT = Gilmore Oral Reading Test; PIAT = Peabody Individual Achievement Test; MAT = Metropolitan Achievement Test; WISC-R = Wechsler Intelligence Scale for Children-Revised; S-BIS = Stanford-Binet Intelligence Scale; WRAT = Wide Range Achievement Test; CAT = California Achievement Test; WJPEB = Woodcock-Johnson Psycho-Educational Battery

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Table 4

Overview of a Study Related to Grouping Practices with LD Students

Reference	Research Design	Subjects	Length of Intervention	Results
Gottleib, 1984	All students participated in both treatment conditions	28 LD students; IQs at least 70; reading level 2nd-4th grade; 156 nonhandicapped students: 3rd-8th grade	2 sessions, plus debriefing	Indicated that children who read with peers of similar ability performed significantly better than when they read with peers of superior ability.